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| 09/559,903 | 04/26/2000 | Zhiping Yin | MI22-1427 | 1798 |
| 21567 | 7590 | 01/11/2006 | EXAMINER | |
| WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201 | | | WILSON, ALLAN R | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2815 | |

DATE MAILED: 01/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/559,903

Applicant(s)

YIN ET AL.

Examiner

Allan R. Wilson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27,33,36-38 and 44-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27,33,36-38 and 44-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/21/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Applicant's amendment dated November 21, 2005 in which claim 27 was amended and 44-52 were added has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 27, 33, 36-38 and 44-52 are rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device.

Claim 27 recites the limitation "the metal silicide" in line 5. There is insufficient antecedent basis for this limitation in the claim. Applicants may be referring to "an annealed metal silicide," but this is not clear. It appears that a metal silicide should come first, then a layer comprising $\text{Si}_x\text{N}_y\text{O}_z$, and finally the process of annealing to form an annealed metal silicide. Not the other way around. Of course, such limitations are best suited for method claims.

Claim 44 recites the limitation "the metal silicide" in line 6. There is insufficient antecedent basis for this limitation in the claim.

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Claim 50 recites the limitation "the titanium silicide" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Claims 33, 36-38 and 44-52 are rejected as being depended on rejected claim 27.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 27, 33, 37, 38 and 44-52 are rejected under 35 USC § 103 (a) as being unpatentable over U.S. Patent No. 6,313,018 to Wang et al. ("Wang") in view of U.S. Patent No. 6,096,662 to Yamazaki et al. ("Yamazaki").

With regards to claims 27, 44 and 50, Wang illustrates in figures 1A-3E (entire document) a gate oxide layer 14c over a semiconductive substrate 12;

a polysilicon layer 14e on the gate oxide layer;

a metal silicide layer 18c on the polysilicon layer;

a layer 52 comprising $\text{Si}_x\text{N}_y\text{O}_z\text{:H}$ formed over and in physical contact with the metal silicide, wherein x is from 0.39 to 0.65 (40% to 50%); an annealed metal silicide being the product of a process in which the metal silicide is subjected to an anneal treatment (see col. 6, lines 1-30) after the layer comprising $\text{Si}_x\text{N}_y\text{O}_z\text{:H}$ is formed, wherein the layer comprising $\text{Si}_x\text{N}_y\text{O}_z\text{:H}$ protects (inherent) the metal silicide layer during the anneal; and

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a silicon nitride layer 54 on the layer comprising $\text{Si}_x\text{N}_y\text{O}_z\text{:H}$ the polysilicon layer, the gate oxide layer, the metal silicide layer, the layer comprising $\text{Si}_x\text{N}_y\text{O}_z\text{:H}$, and the silicon nitride layer being patterned to form the gate stack.

Wang does not show a y is from 0.02 to 0.56, and z is from 0.05 to 0.33. Yamazaki discloses in at least the abstract y is from 0.02 to 0.56, and z is from 0.05 to 0.33. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have y and z in the discloses ratios to protect the metal silicide from moisture.

Finally, the limitation in claim 27 that the silicide is annealed after formation of the antireflective layer and the layer comprising $\text{Si}_x\text{O}_y\text{N}_z\text{:H}$ protects the metal silicide during the anneal is merely a product by process limitation. Note that a “product by process” claim is directed to the product per se, no matter how actually made, MPEP 2113 “Product-by-Process Claims,” In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Marosi et al., 218 USPQ 289; and particularly In re Thorpe, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Applicant has the burden of proof in such cases, as the above case law makes clear. In the instant claims, the processing limitation does not structurally distinguish over that taught by Yao et al. The final product made obvious by Yao et al. and applicant’s prior art as well as the final product instantly claimed, both contain an antireflective layer over, and in direct contact with, a silicide layer. The process of the instant claims has not been shown to

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provide a **structure** which is materially different from that made obvious by Yao et al. in view of applicant's prior art.

With regards to claims 33, 47 and 52, Wang discloses in col. 6, lines 12 and 30 the layer comprising $\text{Si}_x\text{O}_y\text{N}_z\text{:H}$ has a thickness of from about 800 Å. It is well within the level of ordinary skill in the art to use less processing time to produce a thickness of 250Å to about 650Å.

With regards to claims 37, 45 and 51, Wang discloses in the abstract and fig. 2: $x = 0.5$, $y = 0.37$ and $z = 0.13$ is in the bounded region.

With regards to claims 38, 46 and 50-52, Wang discloses in claim 4 a refractory metal silicide, with titanium is a member.

With regards to claim 48, the limitation "protect the metal silicide layer from gaseous oxygen" is an inherent function of the structure and since the prior art has the same structure and materials as the claimed invention it will have the same inherent function.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Response to Arguments

Applicant's arguments with respect to claims 27, 33 and 36-38 have been considered but are moot in view of the new ground(s) of rejection.

The argument that "the term 'annealed' describes a physical feature of the metal silicide layer" is not persuasive. Annealing a metal silicide does not necessarily define a different physical structure. The anneal may not be at conditions that affect the physical structure. Metal silicide are often created by annealing and a second anneal may not have any affect.

Conclusion

Any inquiry concerning this communication or earlier communications from an examiner should be directed to Primary Examiner Allan Wilson whose telephone number is (571) 272-1738. Examiner Wilson can normally be reached 7:00-4:00 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Allan R. Wilson
Primary Examiner
January 9, 2006